

Claims

We claim:

- 1 1. A method for classifying data into multiple classes, the data in each class
2 having a class-conditional probability distribution, comprising:
3 projecting the class-conditional probability distributions of measured
4 data into a likelihood space; and
5 classifying the projected class-conditional probability distributions in
6 the likelihood space according to a discriminant classifier in likelihood
7 space.
- 1 2. The method of claim 1, in which the projecting is non-linear.
- 1 3. The method of claim 1, in which the data are discrete.
- 1 4. The method of claim 1, in which the data are continuous.
- 1 5. The method of claim 1, further comprising:
2 estimating the projected class-conditional probability distributions.
- 1 6. The method of claim 5, further comprising:
2 applying a likelihood maximization process to training data to obtain
3 the estimated class-conditional probability distributions.
- 1 7. The method of claim 5, in which $P_X(X|C_1), P_X(X|C_2), \dots, P_X(X|C_N)$
2 represent true distributions of the data from each of N classes, X represents a

3 random vector, the X within the parentheses represents a specific instance of
 4 the random vector, and P represents a probability that the random vector X
 5 takes the value X , given that the value X belongs to class C_i , and estimates
 6 of true distributions are $\tilde{P}_X(X|C_1)$, $\tilde{P}_X(X|C_2)$,... $\tilde{P}_X(X|C_N)$, and the
 7 likelihood projection of a vector X is an operation $L_N(X)$, resulting in an N -
 8 dimensional likelihood vector Y_X , and a component of the likelihood vector
 9 Y_X is $Y_X = L_N(X) = [\log(\tilde{P}_X(X|C_1)) \log(\tilde{P}_X(X|C_2)) \dots \log(\tilde{P}_X(X|C_N))]$.

1 8. The method of claim 1, in which the data represent a speech signal.

1 9. The method of claim 1, in which the data represent a visual signal.

1 10. The method of claim 1, in which the discriminant classifier is a linear
 2 discriminant with a unit slope.

1 11. The method of claim 1, in which the classifier is a quadratic
 2 discriminant.

1 12. The method of claim 1, in which the classifier is a logistic regression.

1 13. The method of claim 1, in which the classifier in the likelihood space is
 2 a distribution-based classifier.

1 14. The method of claim 1, in which the projecting distribution is a Gaussian
 2 function.

1 15. The method of claim 1 in which the projecting distribution is a mixture
2 of Gaussian functions.

1 16. The method of claim 1, in which the projecting is invertible.